and stirring up opposition. And secondly, someone directly interested is putting up the money. Look for the interested party, and "when found make a note on it."

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**PREVALENCE OF DISCONTENT.**

In a hearing before a Senate Committee which discussed the Owen bill it was stated by a representative of the "National League for Medical Freedom" that said "league" had 50,000 members and that they expected to have 100,000 in a few days—and no fees charged. Quite interesting. It was also intimated that the "eddyites" were strongly opposed to the bill and that the patent medicine fraternity were likewise opposed. Quite a coincidence, is it not? But it is so easy to get a lot of people to object to anything—if it costs them nothing. The world is full of the discontented; it is easy to get them together "agin" anything that means progress. And also, sometimes, it happens that men of intelligence will be a bit crazy on some particular subject and will allow their brains and their energy to be diverted toward the opposition of something that is really good and desirable. For example, the way New York *Life* is opposing animal experimentation and can not see the thousands of lives that have been saved at the cost of a few dogs and guinea pigs. There are people who are "agin" everything and anything that is established; doubtless there are those who violently oppose the arbitrary naming of white and black and who would like to transpose the names. But who is to distinguish? Who is to say what is the *quality* of any opposition? Here are 100,000 people who oppose a certain thing. Probably not 100 of them know just what or why they are opposing it; they just know that someone has said it ought to be opposed and so they feel terribly injured and they go ahead and oppose. It is a queer people, truly; and those 100,000 *objectors* will carry as much weight, with a majority of men as would a similar number of *supporters* of the caliber of Welch or Fischer.

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**A. M. A. MEETING IN LOS ANGELES.**

As the JOURNAL goes to press, word has been received that the meeting of the American Medical Association will be held next year in Los Angeles. The last time that this Association met in California was in San Francisco in 1894 when Dr. Beverly Cole, of San Francisco, was elected President. In thus recognizing the Pacific Coast profession an added impetus will be given to medicine in this section of the country, which has in many particulars already been conspicuous by its enterprise and progress.

Dr. Bert Ellis, of Los Angeles, was made chairman of the Committee of Arrangements.

# ORIGINAL ARTICLES

## SYMPOSIUM ON THORACIC SURGERY.

Fortieth Annual Meeting of the Medical Society of the State of California, Sacramento, April 21, 1910.

## SURGERY OF THE LUNGS.

By ANDREW STEWART LOBINGIER, A. B., M. D., Los Angeles.

The brilliant achievements in modern experimental surgery have within a few years made possible procedures within the thorax which the earnest efforts of a generation of enthusiastic workers had previously failed to accomplish. As in the evolution of every field of surgery, this latest has not been without its grotesque errors. These are easily forgotten, however, in the confidence and security one may have in our present knowledge of respiratory balance.

It is seven years since Mikulicz and Sauerbruch at Breslau, and Brauer and Petersen at Heidelberg, conducted carefully planned experiments to establish a definite respiratory equilibrium. From the beginning the subject of differential pressure has been consistently recognized as the fundamental principle upon which intra-thoracic surgery would be possible. We have seen the evolution of this idea wrought out by Friedrich, Sauerbruch and Meyer with negative pressure, and by Brauer, Robinson, Volhard, Mayer, Kuhn, Sollman, Tiegel, Meltzer and Auer with the positive pressure principle.

There has been a distinct effort toward simplifying and rendering more practicable the apparatus which shall most safely and efficiently establish aeration of the blood, with absence of pneumothorax. The elaborate cabinets of Sauerbruch and Brauer abroad, and of Meyer, Robinson, Green and Janeway in this country, have not met with general favor. These men insist that the simpler methods of intratrachial insufflation, such as have been used by Volhard, Kuhn and Meltzer, are not sufficiently dependable for practical clinical use. Recent reports from Elsberg and Lilienthal, however, using the Meltzer-Auer apparatus at Mt. Sinai Hospital, would seem to quite establish its applicability to human surgery.

Surgeons have hitherto been compelled to predicate every consideration of operative interference in the thorax, upon the solution of the problem of differential pressure. We have furthermore in the study of the surgical pathology of this region, been obliged to content ourselves largely with the pathologic appearances *post mortem,* and been seldom permitted to observe the pathology of the living body. This has retarded no little our interpretation of operable conditions—a subject which lies before us, to a large extent *terra incognito.* Even with the flattering promises which recent reports of experimental surgery of the thorax offer us, it must not be forgotten that they are founded on healthy animals whose vitality has not been decimated by disease and whose organs are normal in conformation, correctly in place and have never been impaired or embarrassed in function by destructive inflammatory change.

I should be derelict in the duty delegated to me in discussing the surgery of the lungs, were empha-

sis not directed to many of the fundamental difficulties which we are destined to encounter in this field. As in the pathology of intra-cranial lesions, unless we shall see these patients before extensive growths or specific deposits have invaded the lung or mediastinum, little will avail of efforts to restore the organs to normal conditions by operative measures. Tumors lying in the mediastinum or primary carcinoma of the lung; operable tuberculous deposits wherever situated, either in lung tissue or bronchial glands; atalectasis and even bronchiectatic accumulations, must all be seen as early as possible before extensive destructive change has occurred in the lung tissue or before important neoplastic and adhesive involvement of the vessels and ganglia result near the hilum,—if surgical interference is to accomplish anything worth while. Most of all do we need to remember that lung tissue is fragile and perishable and that the technic of all intra-thoracic procedure should be faultless. We should be reminded here that the experimental work of Robinson and others on dogs has shown in pneumectomy a tendency of the pleura to pour out a very extensive exudate, which unless a well gauged costal resection is immediately done, will result fatally. The exudate may not only destroy life from a speedy and lethal infection, but it acts mechanically in displacing the heart and vessels in a way which is as fatal as an unrelieved acute gastric dilatation.

Thus far operative measures directed to the lungs have been confined chiefly to pulmonary abscess, gangrene and neoplasms. Pneumectomies which have been done for tuberculosis have not proved very satisfactory. For in lungs where sufficient invasion to justify interference has occurred, the destruction has extended after excision and the process has not been materially stayed. Patients with incipient pulmonary infection are diffident about submitting to operation.

Biondi, Glück and Schmidt carried out elaborate series of experimental pneumectomies looking to excision of tuberculous areas in the human subject. But the work in this field by Tuffier, Lowson, Doyen and Sonnenberg has been so disappointing that we may well share their pessimism. They learned that tuberculosis of the lung could not be arrested in its progress by operation as it could in other tissues. We are not now prepared therefore to entertain the optimistic views held concerning the surgery of the tuberculous lung at the beginning of these clinical studies.

Some of the difficulties in this infection have been manifest from the beginning; others are more obvious in the present light of our knowledge and experience. The lung is at once a delicate and mobile tissue. In tuberculosis, nature seeks to immobilize it. This process results in the destructive adhesions from proliferative inflammation. To interfere surgically is to break down all the barriers to the dissemination of the specific infection which nature has established and at the same time to signally fail in compassing all the foci of infection. From the infected areas left behind repair is feeble and maybe *nil;* and worst of all the dissemination of the infection seems to be rekindled with especial energy. We have long recognized that tubercular processes were arrested by putting the organ or member affected in repose. Murphy had this principle well in mind in his nitrogen gas injections into the pleural cavity. Friedrich has only recently paid a tribute to this distinguished American surgeon for daring to thus boldly and ingeniously apply this accepted law. It has been only one of many original and brilliant contributions to modern surgery from his gifted mind. We know now that such measures as will most certainly and speedily arrest tuberculous deposits in the lung are to be commended in the treatment of this organ, and pneumectomy, either by knife or by the cautery, has not been attended by sufficient success to commend it to our favor.

A more hopeful view is presented in pulmonary abscess—especially of the single or confluent bronchiectatic type. This condition may be treated by costal resection or by thoracotomy and drainage. Adhesions may be established if a thoracotomy be sellected which may enable the surgeon to disregard the precautionary safeguards of differential pressure. It is not wise, however, to rest in the hope that adhesions between the organic and costal pleura have become firmly established. Many of these patients are greatly enfeebled by the long and depleting sepsis; and with the knowledge and intelligence now at our command a differential pressure apparatus should invariably be provided.

In the surgical treatment of *Emphysema vesicula* distinct benefit has been derived from resection of four or five ribs including the costal cortex. Unless this periosteal covering is carefully dissected out the thoracic wall will speedily regain its rigidity and the lung again become overdistended. Firm pressure should be applied over the resected area in order to favor collapse of the chest wall and obliteration and rest of the confluent vesicles.

I have had no personal experience with echinococcus cyst of the lung but it should be, and clinical reports have shown it to be, as amenable to surgical treatment as in its invasion of the liver. Not a few cases reported have been associated with echinococcus of the liver.

I have had one case of ray fungus of the lung. The anamnesis showed the infection to have started in the right tube and ovary and to have extended to the right kidney, to the liver, gall bladder, pancreas and the lower lobe of the right lung. The lung was invaded several weeks before dissolution and at no time during the year's illness was the progress of the disease arrested in the slightest degree by any of the various surgical measures which were employed. It was obvious that nothing could be accomplished by a pneumectomy, where so extensive involvement of other organs existed. Medical measures employed by consulting physicians proved equally fruitless in this case. I am of the opinion that advanced and widely disseminated infection from actinomycosis, whether in the lung, liver or kidney, is incurable. Many so-called cases of "actinomycosis cured" have crept into the literature and been reported in our societies, which would have been excluded had a competent pathologist been called to pass upon the "rays."

The invasion of the mediastinum, the lung or the thoracic wall with carcinoma and sarcoma will have

added surgical interest to us now that pneumothorax need no longer be dreaded. It is true that mediastinal tumors have been removed without invading the pleural cavity, but they were situated well anterior and were not extensively infiltrating. Krause, Garrè and Heidenhain have removed portions of the lobes of the lung invaded by new growths. They urge early diagnosis and radical resection. In the eight or ten cases which have come under my observation not a single patient was seen early enough to have justified the slightest hope of more than temporary benefit from operation. Until we shall be permitted to explore the chest when the radiogram, together with clinical signs, reveals a growth within, we shall still continue to do autopsies on patients who were at one time in the course of the disease just as operable as are those with early pyloric cancer. Radiography has contributed more to the intelligent interpretation of lesions in the thorax than within the abdomen; and the X-ray by fluoroscope or plate, will continue to be an invaluable adjunct in determining what shall be done in the surgery of the thoracic organs.

It is too soon to measure with any degree of precision the various technical methods employed in the surgery of the lung. These must remain largely a matter of personal equation. All must agree with Friedrich that nowhere, not even in the work on the brain, is such strict asepsis required. The simple intercostal incision is preferred except where gangrene or an extensive neoplasm will require an osteoplastic resection for wider vision.

In pneumectomy the care of severed bronchus stump is vital and the technic of Meyer, i. e. crushing the bronchus and inverting as in appendectomy, will avert a fatal tension pneumothorax. Where any extent of lung tissue has been removed, it is best, as shown by Robinson, to resect four or five ribs to ensure compensatory collapse of the thoracic wall. This surgeon found that if too small a number of ribs were resected a fatal accumulation of fluid would result. In the total excision of a lobe the line of approach to the hilum and the important vagus plexuses, has been clearly defined by Friedrich. Lenhartz has advocated operation in two stages; but improved differential apparatus will make such a precaution in technic unnecessary. Greatest care should be taken to inflate the lung as fully as possible before the thorax is closed. In partial lobe excision this can only be employed with the portion of the lung still remaining. Even greater care must be exercised in making a perfect air-tight closure of the thoracic wall. Extensive adhesions must be broken up with the utmost gentleness, and bleeding points should be ligated wherever possible.

The daring efforts of Trendelenberg at his Leipsic clinic in three cases of thrombosis of the pulmonary artery are illustrations of the possibility in spectacular lung surgery. Few surgeons are capable of clearing out a thrombosed artery deep in the thorax in fifteen minutes, the limit Trendelenberg allows for this procedure. One is reminded here of Carrel's self-reproach for failure to do an anastamosis of a cold storage segment of the jugular, between the descending aorta and the coronary artery, in less than five minutes. He näively tells us that unless he can do it in three minutes there is no hope for the dog. Fortunately the perfecting of differential pressure apparatus permits the surgeon to be deliberate and thorough in his work on the lung and in due time this great principle will place the surgery of the thorax on as secure a footing as intra-abdominal surgery occupies to-day.

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## DIFFERENTIAL PRESSURE.

By DUDLEY TAIT, San Francisco.

Differential pressure is to thoracic surgery what asepsis is to surgery of the abdomen. Bacteriology blazed the way for the latter; physiology made the former possible. Some may continue to procrastinate, mechanically trained surgeons may refuse to discard their crude procedures of Hippocratic origin; they can neither retard the triumphal advance of physiological methods into the domain of surgery of the chest nor attenuate in any sense the need, the importance and the farreaching results of said invasion.

Prior to the present physiologic era, the record of thoracic surgery, compared with that of other regions, was one of lamentable, blind flounderings. The explanation is simple: surgeons knew not how to deal with the pneumothorax resulting from the opening of the pleural cavity; they were unable to maintain the normal difference in pressure which exists between the pleura and the interior of the lung. Pneumothorax was thus the great barrier that retarded the dawn of a rational thoracic surgery.

Normally, the lungs, distended by atmospheric pressure (760 mm.) from within, are in a state of elastic tension. If, however, an opening be made in the pleura sufficient to admit air, the pressure of air within and without the lung immediately counterbalances and the elastic tissue at once recoils. Hence collapse of the lung. In order to prevent collapse or retraction of the lung, all that is necessary is to establish between the interior and the exterior of the lung a constant difference of pressure equal to the pulmonary retractility, i. e., from 7 to 8 mm. of mercury. This may be done by the use of either positive pressure within the lung or negative pressure without.

Seven mm. of mercury corresponds to an altitude difference of about 250 feet. In mounting or descending in the elevator of any tall modern building, we are, within the space of a few moments, experiencing pressure differences greater than those used by either plus or minus methods in surgery of the chest. Furthermore, as Willy Meyer remarked, we must remember that the daily variations in the barometric pressure may be more than